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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/786,282	02/24/2004	Shin-Tson Wu	UCF-388	2414

7590 11/01/2005

Law Offices of Brian S. Steinberger
101 Brevard Avenue
Cocoa, FL 32922

EXAMINER	
CALEY, MICHAEL H	
ART UNIT	PAPER NUMBER
2871	

DATE MAILED: 11/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/786,282	WU ET AL.	
	Examiner	Art Unit	
	Michael H. Caley	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 August 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *24 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections – 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 2, 4, 6-9, 13, 14, 16, and 18-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ozawa et al. (U.S. Patent No. 2003/0160928 "Ozawa") in view of Arakawa et al. (U.S. Patent No. 6,400,433 "Arakawa").

Regarding claim 1, Ozawa discloses a flower-shaped vertical alignment structure liquid crystal display with fast response, high contrast ratio and wide view angle comprising:

a first substrate (Figure 5 element 10A) with a protrusion shaped electrode (Figure 5 element 9) as the pixel electrode on an interior surface of the first substrate;

a second substrate with a common electrode on an interior surface of the second substrate (Figure 5 elements 25A and 31);

aligning layers formed on the first and second substrates providing liquid crystal vertical alignment (Figure 5 elements 23 and 33);

liquid crystal materials (Figure 5 element 50) filling a space between the first and second substrates as a liquid crystal cell; and

a first circular polarizer disposed on an exterior surface of the first substrate; and

a second circular polarizer on an exterior surface of the second subsrate, wherein a circularly polarized light produced by the first and second circular polarizers is used as a light source so that the liquid crystal display operates in a transmissive mode (Page 6 [0069], Page 1 [0004], Page 6 [0071]).

Ozawa fails to disclose the circular polarizers as each formed of a linear polarizer and wide band quarter-wave film. Arakawa, however, teaches a circular polarizer as advantageously comprising a linear polarizer and a wide-band quarter wave film so that light may be uniformly polarized across visible wavelengths of light (abstract, Column 3 lines 1-9).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed the circular polarizer from a linear polarizer and wide band quarter wave film as proposed. One would have been motivated to form the circular polarizer accordingly such that uniform polarization may occur across the visible range of light as is preferred in a color liquid crystal display as disclosed by Ozawa (Arakawa: Column 1 lines 12-32).

Regarding claim 2, Ozawa discloses the common electrode as having an empty hole (Figure 5 element 31M).

Regarding claim 4, Ozawa discloses the aligning layer as a polymer (Page 5 [0067]).

Regarding claim 6, Ozawa discloses the pixel electrode as having a shape selected from at least one of: conic, spherical, semi-spherical tower, pyramid and column-like (Figures 4 and 5 element 21).

Regarding claim 7, Ozawa discloses the pixel electrode as including an indium tin oxide layer (Page 5 [0067]).

Regarding claim 8, Ozawa discloses the shape of the empty hole as selected from at least one of: circular, elliptical ring-shaped, square and rectangular (Figures 4 and 5 element 31M).

Regarding claim 9, Ozawa discloses the common electrode as including an ITO layer (Page 5 [0068]).

Regarding claims 13, 14, 16 and 18-21, Ozawa discloses the steps applying a voltage to the LCD to generate an electric field distribution having a flower blossom configuration in order to provide the LCD with the wide view angle, fast response, and high contrast ratio (Figure 5 element 50B; Page 6 [0077], Page 1 [0002]).

Claims 3 and 15 rejected under 35 U.S.C. 103(a) as being unpatentable over Ozawa in view of Arakawa and in further view of Shimoshikiryo (U.S. Patent No. 6,850,301).

Ozawa as modified by Arakawa discloses all of the proposed limitations except for the hole as having a hexagon shape. Shimoshikiryo, however, teaches a hexagon shaped holes as an

alternative to a square, circle, or other polygon, due to their ability to be closely arranged on an electrode and their ability to produce a more axially symmetrical orientation (Column 31 line 66 – Column 32 line 10).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed the hole disclosed by Arakawa to have a hexagon shape. One would have been motivated to use a hexagon shape as an alternative to a rectangular shape due to its ability to produce a more axially symmetric orientation and its ability to be more closely arranged to other holes of the same type (Column 31 line 66 – Column 32 line 10).

Claims 5 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ozawa in view of Arakawa and in further view of Lu et al. (U.S. Patent No. 6,426,786 "Lu").

Regarding claim 5, Ozawa as modified by Arakawa fails to disclose the aligning layer as an inorganic layer. Lu, however, teaches an inorganic aligning layer as advantageous due to its stable chemical properties in enduring exposure to various types of illumination (Column 3 lines 48-55).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed the aligning layer of the display device disclosed by Ozawa from an inorganic material. One would have been motivated to use an inorganic material to extend the service life of the alignment layer and display (Column 3 lines 48-55).

Claims 10 and 22 rejected under 35 U.S.C. 103(a) as being unpatentable over Ozawa in view of Arakawa and in further view of Ikeda et al. (U.S. Patent No. 6,671,025 "Ikeda").

Ozawa as modified by Arakawa fails to disclose the common electrode as including wall-bump protrusions on the ITO layer. Ikeda, however, teaches bump protrusions and slits as interchangeable to achieve a common effect of establishing liquid crystal alignment partitions (Figures 6A and 6B; Column 8 line 52 – Column 9 line 20).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have form bump protrusions on the common electrode ITO layer in the display device disclosed by Ozawa. One would have been motivated to form bump protrusions as an alternative method of forming the alignment partitions on the counter substrate (Column 8 line 52 – Column 9 line 20).

Claims 11 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ozawa in view of Arakawa and in further view of Matsuyama et al. (U.S. Patent No. 5,969,781 "Matsuyama").

Ozawa as modified by Arakawa is silent on the dielectric anisotropy of the liquid crystal. Matsuyama teaches a vertically aligned mode display as compatible with either a positive or negative dielectric anisotropy liquid crystal. Matsuyama teaches further advantages of a positive dielectric anisotropy in that it may attain higher contrast levels and faster response time (Column 5 lines 43-56).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the display device disclosed by Ozawa with a liquid crystal material having

positive dielectric anisotropy. One would have been motivated to choose a liquid crystal material having positive dielectric anisotropy to benefit from the expected results of such a parameter such as increased contrast as taught by Matsuyama.

Claim 12 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ozawa in view of Arakawa and in further view of Yoshida et al. (U.S. Patent No. 6,512,564 "Yoshida").

Ozawa as modified by Arakawa is silent on the dielectric anisotropy of the liquid crystal. Yoshida teaches a liquid crystal display as compatible with either a positive or negative dielectric anisotropy liquid crystal. Yoshida teaches further advantages of a negative dielectric anisotropy in that it is more compatible with a vertical alignment layer (Column 13 lines 9-15).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the display device disclosed by Ozawa with a liquid crystal material having negative dielectric anisotropy. One would have been motivated to choose a liquid crystal material having positive dielectric anisotropy to benefit from the expected results of such a parameter such better compatibility with a vertical alignment layer as taught by Yoshida.

Claims 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ozawa in view of Arakawa and in further view of Koma (U.S. Patent No. 5,666,179).

Regarding claim 25, Ozawa as modified by Arakawa discloses each of the proposed limitations except for the electric field as having generally expanding concentric patterns. Koma, however teaches such a field exhibited by the orientation of the liquid crystal directors

and symmetry of the electrode layout (Figures 6 and 7). Koma teaches such an electrode and electric field as advantageous to provide a uniform viewing angle characteristic at all viewing angle directions (Column 5 lines 42-60).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed the electric field to have generally expanding concentric patterns in the display device disclosed by Ozawa. One would have been motivated to design the display for such an electric field as an optimization of the display for a particular viewing angle characteristic as taught by Koma in which the viewing angle characteristic is uniform at all viewing angle directions (Column 5 lines 42-60).

Response to Arguments

Applicant's arguments filed 8/22/05 have been fully considered but they are not persuasive.

Regarding the rejection of claims 1, 2, 4, 6-9, 13, 14, 16, and 18-21 as unpatentable over Ozawa in view of Arakawa, Applicant argues that the references fail to provide motivation for modifying Ozawa to add circular polarizers to the top substrate and the bottom substrate and that the modification would not produce the transmissive mode liquid crystal display disclosed. The examiner disagrees, however, and maintains the rejections.

Ozawa specifically states that circular polarizers are to be placed on the exterior surfaces of the top and bottom substrates (Page 6 [0069]) such that this feature of the claim is anticipated by Ozawa. The circularly polarized light produced by the top and bottom circular polarizers is inherently used as a light source given the construction and the operating mode of the display

(Page 1 [0004], Page 6 [0071]). Furthermore, Ozawa anticipates the limitation "so that the liquid crystal display operates in a transmissive mode" since it is capable of operation in both the reflective and transmissive modes (Page 1 [0004], Page 6 [0071]). When operating in the transmissive mode, the light necessarily passes through both circular polarizers such that the light exiting the first and second circular polarizers is considered to be used as a light source.

Further regarding claim 2, it is unclear to the examiner how Applicant arrives at the conclusion that "the configuration disclosed in Ozawa is limited to only using negative dielectric liquid crystal materials to meet the working principle of the transflective mode". Ozawa clearly discloses an empty hole in the common electrode (Figure 5 element 31M).

Further regarding claim 13, Ozawa discloses a circular polarizer in the liquid crystal display (Page 6 [0069]) and the display as operating in the transmissive mode (Page 1 [0004], Page 6 [0071]).

Regarding claims 3 and 15, the examiner holds that the cited references teach and provide motivation for the claimed limitations as addressed above.

In response to applicant's argument that Shimoshikiryo fails to recognize the manufacturing advantages of the hexagon-shaped hole, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

Regarding claims 5 and 17, and in response to applicant's argument that Lu fails to recognize rubbing process shortcomings, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

Further regarding claims 11 and 23, Matsuyama provides a teaching that high contrast levels are attainable in addition to other advantages by using a liquid crystal of a positive dielectric anisotropy in a vertically-aligned liquid crystal display due to its greater absolute value of dielectric constrant. Matsuyama teaches a high contrast due to greatest change in transmissivity. Applicant's allegations contradicting the teachings of Matsuyama are not persuasive in overcoming the rejection. Arguments are insufficient to prove that a greater change in transmissivity is possible through a negative dielectric anisotropy than a positive dielectric anisotropy, contradicting the teachings of Matsuyama. Furthermore, Matsuyama discloses faster response time of positive dielectric anisotropy liquid crystal as another advantage (Column 5 lines 43-56).

Regarding claims 25 and 26, although Applicant cites differences between the disclosures of the applied references, the examiner holds that Koma provides a valid teaching of a symmetric electrode layout to produce generally expanding concentric patterns motivated by the result of a uniform viewing characteristic from all viewing directions as addressed above.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael H. Caley whose telephone number is (571) 272-2286. The examiner can normally be reached on M-F 8:30 a.m. - 5:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (571) 272-2293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Michael H. Caley
October 31, 2005

mhc

ANDREW SCHECHTER
PRIMARY EXAMINER